NR

ENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION** see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
SCB551PCT		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/EP 00/ 05836	23/06/2000	25/06/1999
Applicant		
ABIOGEN PHARMA S.P.A.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

   a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   [ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

   b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

   [ ] contained in the international application in written form.

   [ ] filed together with the international application in computer readable form.

   [ ] furnished subsequently to this Authority in written form.

   [ ] furnished subsequently to this Authority in computer readble form.

   [ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   [ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [ ] **Unity of invention is lacking** (see Box II).

4. With regard to the **title,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established, according to Rule 38.2(b). by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. 1

   [ ] as suggested by the applicant.

   [X] because the applicant failed to suggest a figure.

   [ ] because this figure better characterizes the invention.

   [ ] None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No
P[redacted]EP 00/05836

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A01N59/04 A01N59/00 A01N35/02 C02F1/76 C02F1/50
A61L2/20 F17C11/00 F17C1/00 //(A01N59/04,59:00,35:02)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A01N C02F A61L F17C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 611 937 A (JAROCKI GEORGE J) 18 March 1997 (1997-03-18) column 2, line 8-18 column 2, line 62 -column 3, line 37 ---	1-3,5-7, 9,10, 12-14
X	US 3 943 261 A (AMON ANTON ET AL) 9 March 1976 (1976-03-09) column 3, line 5 -column 4, line 23 ---	1-3,5-7, 9,10, 12-14
X	US 5 043 175 A (BAYLEY PETER T ET AL) 27 August 1991 (1991-08-27) column 2, line 60-64 column 3, line 9-18 column 3, line 38-45 column 4, line 5-15 --- -/--	1-3,5-7, 9,10, 12-14

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
6 October 2000	17/10/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Klaver, J

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Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International Application No
P[redacted]EP 00/05836

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 650 405 A (MORRISON ROBERT L) 21 March 1972 (1972-03-21) cited in the application column 2, line 52-73; figure 4	1-14
X	DATABASE WPI Section Ch, Week 199444 Derwent Publications Ltd., London, GB; Class D22, AN 1994-353796 XP002149503 & JP 06 277268 A (IWATANI IND CO LTD), 4 October 1994 (1994-10-04) abstract	1,5,6, 9-14
X	DATABASE WPI Section Ch, Week 199641 Derwent Publications Ltd., London, GB; Class D22, AN 1996-404740 XP002149504 & JP 02 533039 B (KOBAYASHI T), 11 September 1996 (1996-09-11) abstract	1,5,6, 9-14
X	DATABASE WPI Section Ch, Week 199423 Derwent Publications Ltd., London, GB; Class B07, AN 1994-189823 XP002149505 & SU 1 803 127 A (TRANSPORT CHEM EQUIP CONS BUR), 23 March 1993 (1993-03-23) abstract	1,5,6, 9-14
X	EP 0 404 015 A (NAKAMURA JUNSUKE) 27 December 1990 (1990-12-27) page 3, line 34-42; figure 1; examples 1-3	1,5,6, 9-14
X	DE 197 06 842 A (BINKER MATERIALSCHUTZ GMBH) 27 August 1998 (1998-08-27) page 2, line 3-5 page 2, line 46-52	1,5,6, 9-14

1

INTERNATIONAL SEARCH REPORT

Info on patent family members

International Application No
P[redacted]EP 00/05836

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5611937 A	18-03-1997	NONE	
US 3943261 A	09-03-1976	BR 7407539 A	04-11-1975
		DE 2444685 A	27-03-1975
		ES 430126 A	16-01-1977
		ES 449905 A	01-07-1977
		FR 2243909 A	11-04-1975
		GB 1487197 A	28-09-1977
		IN 143190 A	15-10-1977
		IT 1021461 B	30-01-1978
		JP 995710 C	30-04-1980
		JP 50076276 A	21-06-1975
		JP 54028466 B	17-09-1979
		US 4051034 A	27-09-1977
US 5043175 A	27-08-1991	DK 166591 A	02-04-1992
		FR 2667223 A	03-04-1992
		GB 2248543 A	15-04-1992
		NL 9101650 A	06-05-1992
US 3650405 A	21-03-1972	NONE	
JP 6277268 A	04-10-1994	NONE	
JP 2533039 B	25-01-1994	JP 6014980 A	25-01-1994
SU 1803127 A	23-03-1993	NONE	
EP 0404015 A	27-12-1990	AT 101317 T	15-02-1994
		DE 69006548 D	24-03-1994
		DE 69006548 T	26-05-1994
		DK 404015 T	21-03-1994
		ES 2048898 T	01-04-1994
		JP 1959617 C	10-08-1995
		JP 3188004 A	16-08-1991
		JP 6084287 B	26-10-1994
		US 6043287 A	28-03-2000
DE 19706842 A	27-08-1998	NONE	

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the International application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When? Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How? Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

NOTES TO FORM PCT/ISA/220 (continued)

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped),whether

(i) the claim is unchanged;

(ii) the claim is cancelled;

(iii) the claim is new;

(iv) the claim replaces one or more claims as filed;

(v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."

2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."

3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."

4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international appplication is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

PATENT COOPERATION TREATY

BA-22801

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

MINOJA, Fabrizio
BIANCHETTI BRACCO MINOJA S.R.L.
Via Rossini, 8
I-20122 Milano
ITALIE

RICEVUTO IL
RECEIVED ON
17 SET 2001
BIANCHETTI-BRACCO-MINOJA srl

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Rule 71.1)

Date of mailing *(day/month/year)*	13.09.2001
Applicant's or agent's file reference: SCB551PCT	IMPORTANT NOTIFICATION

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/EP00/05836	23/06/2000	25/06/1999

Applicant: ABIOGEN PHARMA S.P.A. et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.

2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.

3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/	Authorized officer
European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Galatioto, M Tel.+49 89 2399-7849

Form PCT/IPEA/416 (July 1992)

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 21 February 2001 (21.02.01)	
International application No. PCT/EP00/05836	**Applicant's or agent's file reference** SCB551PCT
International filing date (day/month/year) 23 June 2000 (23.06.00)	**Priority date** (day/month/year) 25 June 1999 (25.06.99)
Applicant VALENTINI, Giorgio et al	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International Preliminary Examining Authority on:

09 January 2001 (09.01.01)

[ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

[ ] was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO **34, chemin des Colombettes** **1211 Geneva 20, Switzerland**	Authorized officer R. E. Stoffel
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT OR THE DECLARATION

(PCT Rule 44.1)

To:
BIANCHETTI BRACCO MINOJA S.R.L.
Attn. MINOJA, Fabrizio
Via Rossini, 8
I-20122 Milano
ITALY

RICEVUTO IL
RECEIVED ON
17 OTT. 2000
BIANCHETTI-BRACCO-MINOJA srl

Applicant's or agent's file reference SCB551PCT	Date of mailing *(day/month/year)* 17/10/2000 **FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. PCT/EP 00/ 05836	International filing date *(day/month/year)* 23/06/2000
Applicant ABIOGEN PHARMA S.P.A.	

1. [X] The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:
The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Fascimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. [ ] The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. [ ] **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

[ ] the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

[ ] no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90*bis*.1 and 90*bis*.3, respectively, before the completion of the technical preparations for international publication.

Within **19 months** from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within **20 months** from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Véronique Baillou

Form PCT/ISA/220 (July 1998)

US 3,943,261 describes a process for water disinfection and carbonation, wherein the disinfectant from a container is mixed with CO2 in a carbonator under pressure.

US 5,611,937 which is an improvement over US 3,943,261 discloses an apparatus and method for treating water from a local supply, wherein the water is mixed with a chlorine disinfectant and introduced into a holding vessel maintained at ambient pressure , into which CO2 is added.

US 5,043,175 discloses a method and apparatus for sterilisation of animal feed, wherein vaporised chlorinated water produces a mixture of chlorine, gas, steam, and products of combustion which are intimately contacted with the feed product in a mixer conditioner.

JP 06 277 268 A, JP 02 533 039 B and SU 1 803 127 disclose sterilisation plants comprising, inter alia, separate tanks for different substances to be mixed in a sterilising chamber or in an ejection mixer.

EP 0 404 015 describes a disinfection apparatus comprising a carbon dioxide cylinder (10) and a disinfectant composition tank (14), both connected to a spry gun (15) for delivering the disinfectant composition by means of the vaporised carbon dioxide.

GB 480 176 dating back to 1936, discloses a method of

purifying air by the dissemination of a hypochlorite solution. The liquid solution is sprayed by a supply of air under pressure as from a cylinder, which can have a definite carbon dioxide content. However the hypochlorite solution is not contained in the cylinder.

CLAIMS

1. Method for the preparation, storage and metering of disinfectant and biocides which comprises mixing of said substances in a pressurised container with carbon dioxide in the form of a vapour, liquid/vapour mixture or supercritical fluid.

2. Method as claimed in claim 1, in which the disinfectant substances are selected from chlorine or compounds capable of developing active chlorine.

3. Method as claimed in claim 1, in which the compounds capable of developing active chlorine are alkali or alkaline-earth hypochlorites.

4. Method as claimed in claim 1 or 2, in which chlorine gas is mixed in the presence of an anhydrous salt in the container.

5. Method as claimed in one of the preceding claims, in which the mixture of carbon dioxide and disinfectant compound is metered in a manual, automatic or timed way.

6. Pressurised container containing a mixture of carbon dioxide and disinfectants or biocides compatible with carbon dioxide.

7. Container as claimed in claim 6, in which the disinfectant agent is selected from chlorine gas or alkali or alkaline-earth hypochlorites.

8. Container as claimed in claim 6, in which the container contains a desiccant anhydrous salt.

9. Container as claimed in one of claims 1 to 8, which is suitable for delivery and metering in a continuous or

discontinuous controlled manner.

10. Container as claimed in one of claims 6 to 9, which is suitable for delivering a single dose.

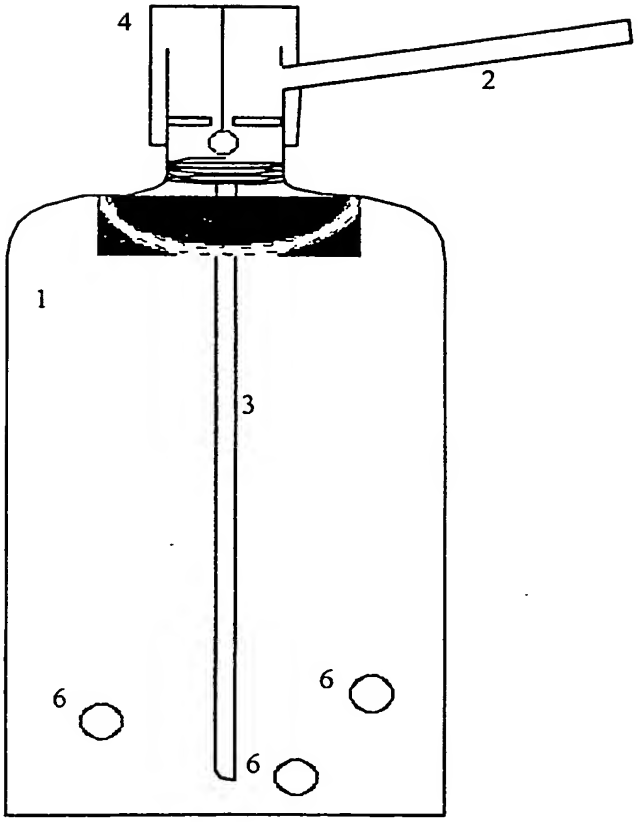
11. Container as claimed in claim 10, in the form of canisters, metal cartridges, vials or syringes.

12. Container as claimed in one of claims 6 to 9, suitable for delivering multiple doses.

13. Container as claimed in claim 12, in the form of cylinders or ampoules or tanks fitted with a sealed septum and/or a metering device.

14. Container as claimed in one of claims 6 to 13, in which the mixture is in liquid, semifluid, paste, gel or solid form.

FIGURE 1



PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
SCB551PCT		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/EP00/05836	23/06/2000	25/06/1999
International Patent Classification (IPC) or national classification and IPC A01N59/04		
Applicant ABIOGEN PHARMA S.P.A. et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
09/01/2001	13.09.2001
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Klaver, J Telephone No. +49 89 2399 8601

Form PCT/IPEA/409 (cover sheet) (January 1994)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP00/05836

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:
Description, pages:

1-15	as originally filed	
2a-2b	with telefax of	15/06/2001

Claims, No.:

1-10	with telefax of	15/06/2001

Drawings, sheets:

2/2	as originally filed	
1/2	with telefax of	15/06/2001

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   - ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
   - ☐ the language of publication of the international application (under Rule 48.3(b)).
   - ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   - ☐ contained in the international application in written form.
   - ☐ filed together with the international application in computer readable form.
   - ☐ furnished subsequently to this Authority in written form.
   - ☐ furnished subsequently to this Authority in computer readable form.
   - ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
   - ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   ☐ the description, pages:
   ☐ the claims, Nos.:
   ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	2, 3 - 10 (part)
	No:	Claims	1, 5 - 9 (part)
Inventive step (IS)	Yes:	Claims	2, 3 - 10 (part)
	No:	Claims	1, 5 - 10 (part)
Industrial applicability (IA)	Yes:	Claims	1 - 10
	No:	Claims	

2. Citations and explanations
   see separate sheet

1). Insofar as the claims define pressurised containers containing an unspecified disinfectant or biocide they are anticipated by the following documents:
JP 6 277 268 A (= D5) discloses an apparatus for gas sterilization of medical instruments comprising, *inter alia,* a tank (6) filled with a mixed gas of ethylene oxide and carbon dioxide.
JP 2 533 039 B2 (= D6) discloses a gas cylinder (3) comprising a liquefied mixed gas of ethylene oxide and carbon dioxide for sterilizing medical appliances.
AU 1996 64 212 B2 (= D10) (not cited in the International Search Report (ISR)) discloses gas cylinders filled with fumigant or sterilising gases such as phosphine, carbonyl sulfide, methyl bromide or ethylene oxide in a mixture of carbon dioxide and nitrogen (see page 2, line 21 - page 3, line 23; Example and claims 6 and 7).
D5, D6 and D10 thus anticipate the novelty of claims 1 and 5 - 9, the features of claims 5 - 9 being normal equipment features of commonly used gas cylinders.
Said claims 1 and 5 - 9 hence do not meet the criteria of Art. 33 (2) PCT.

Insofar as claim 10 depends on claim 1, its subject-matter is not considered to be based on an inventive step, since it either is well-known in the art to use solid forms of the biocidal ingredient (phosphine) or it has not been disclosed in the application how the particular aggregation forms as defined in claim 10 may be obtained for substances other than hypochlorites.
Claim 10, insofar as defining a container containing an undefined biocide, hence does not meet the criterion of Art. 33 (3) PCT.

2). The prior art as defined by the documents cited in the ISR does not disclose pressurized containers comprising a mixture of chlorine gas or compounds capable of developing active chlorine (hypochlorites) and carbon dioxide.
The subject-matter of claims 2 and 3 - 10, insofar as dependent on claim 2, hence is novel (Art. 33 (2) PCT).
The prior art insofar as relating to the use of chlorine or hypochlorite based disinfectants discloses carbon dioxide as advantageous propellant or additional disinfectant gas (see e. g. US 5,611,937 (D1), US 3,943,261 (D2) and US 3,650,404 (D4)), but carbon dioxide is always added from an external source to the chlorine/hypochlorite composition or system. There is no disclosure or suggestion in the available prior art, that chlorine or hypochlorite may be combined in a single pressurized container resulting in a stabilised disinfectant composition that can be simply and effectively dispersed in the receiving

medium. Possible modulation of the viscosity of the hypochlorite based compositions is a further advantageous embodiment of the invention which has not been disclosed or suggested in the prior art.

The containers as defined by present claims 2 and 3 - 10 insofar as dependent on claim 2 hence are considered to be based on an inventive step (Art. 33 (3) PCT).

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(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

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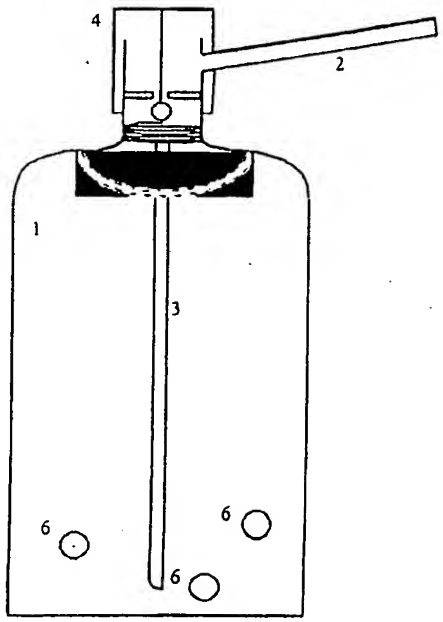
(54) Title: METHOD FOR PREPARATION OF BIOCIDES MIXED WITH CARBON DIOXIDE IN A PRESSURISED CONTAINER



(57) Abstract: This invention relates to a method for the preparation and metering of substances, mixtures of substances and/or compounds in general, characterized by bacteriostatic and/or bactericidal activity, using a single pressurized container in which the substances, mixtures of substances and/or compounds in general are mixed with carbon dioxide in the form of vapour, liquid/vapour mixture or supercritical fluid for the purpose of mixing, dissolving, storing and dispensing at constant predetermined doses. The invention also relates to pressure containers suitable for dispensing the substances in accordance with the invention.

WO 01/00030 A1

patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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METHOD FOR PREPARATION OF BIOCIDES MIXED WITH CARBON DIOXIDE IN A PRESSURISED CONTAINER

FIELD OF APPLICATION

This invention relates to a method for the preparation of substances, mixtures of substances and/or compounds in general having a disinfectant and biocide function, which are mixed, preserved, dissolved and metered by a single pressurised container in the presence of carbon dioxide in the form of a vapour, liquid/vapour mixture or supercritical fluid.

One of the most stringent requirements in the field of disinfection practices is to have substances that are effective, safe, and such to be metered in a controlled way with predetermined efficacy.

For this purpose, the substances used must be stable under storage.

Various attempts have been made to prepare compounds and mixtures with a biocide action, deliver them with the maximum simplicity and under safe conditions and maintain their dose constant, without deterioration of the said substances during storage, but the various problems have never been solved completely and simultaneously.

PRIOR ART

The oxidizing action of chlorine gas probably constitutes the first large-scale application of a biocide in the water treatment. Chlorine gas and the precursors which can produce chlorine gas under the conditions of use have great merits in terms of efficacy, but also a number of limitations in terms

of applications.

In the field of disinfection of water intended for human consumption, in which chlorine compounds are extensively used, one of the most evident limitations on the use of this biocide is the inevitable alteration in the taste of the treated water deriving from the presence of chlorine in the amounts required to ensure biocide effect.

In addition, the are scientific evidences that chlorine reacts with the organic matter present in the water to produce traces of organo-chorine compounds (trihalomethanes or, more generally, AOX) with are very critical from the toxicological point of view due to the recognised cancer-producing activity.

It would therefore be highly desirable to meet hygienic standard of the water using the lowest amounts of chlorine.

In the field of the treatment of swimming pool water the simultaneous delivering of chlorine and carbon dioxide, using two separate pressurized cylinders feed to a special dispersion head, has been patented (see U.S. Pat. No. 3650405, issued to Morrison). By this technique a better dispersion and a higher efficiency of chorine is achieved.

This system, as every system in which the presence of chlorine gas under pressure is concerned, shows a number of problems related, first, to safety aspects. Additional problems concern technical and operational construction of the plants and devices used for chorine dispensing, the complexity of obtaining mixtures with a constant active chlorine content, and the difficulty to meter these mixtures in a constant, uniform manner.

DESCRIPTION OF THE INVENTION

This invention relates to a method for the delivering of disinfectants and biocides which consists of mixing the said substances with carbon dioxide in the form of a vapour, a liquid/vapour mixture or supercritical fluid, in a single pressurised container.

The invention also relates to pressurised containers designed to meter and deliver the mixture of carbon dioxide and disinfecting compounds.

Among the different fields in which the invention can be positively and originally applied, the following ones can be taken as representative examples:

- disinfection of drinking water (for human and animal consumption, including aquaria)
- disinfection of private and sanitary areas (living quarters, swimming pools, public baths, air-conditioning systems, walls and floors, toilets, chemical toilets, waste water, hospital waste, soil or other surfaces, such as gymnasiums and school classrooms)
- veterinary hygiene (including hygiene both for animals and for disinfection of the areas in which animals are housed, kept or transported, and for the treatment of waste water and dung from animal breeding units)
- human and animal nutrition (in the disinfection of equipment, containers, eating utensils, surfaces or piping used for the production, transport, storage or consumption of food, animal feed or drinks, including drinking water, intended for human or animal consumption)
- storage of products in cans, cling-film or

wrappings (control of deterioration caused by micro-organisms in foodstuffs, paints, plastics, sealants, adhesives, binders, paper, objets d'art, etc.)

- preservation of wood, fibres, leather, rubber and polymers (control of microbiological deterioration)

- preservation of masonry, for liquids in industrial treatment and cooling systems, in lubricants (also emulsified) and fluids used in industrial processes (e.g. preservation of water or other fluids used in industrial cooling and treatment systems involving the control of micro-organisms, algae and molluscs)

- preservation against the formation of slimy substances

- control of harmful animals

- control of fouling (by organisms on boats, aquaculture equipment or other structures used in water)

- embalming and taxidermy (disinfection and preservation of corpses and parts thereof).

Examples of compounds with an antibacterial and disinfecting action usable in accordance with the invention include chlorine gas, compounds able to generate chlorine (such as alkali or alkaline-earth hypochlorites, preferably sodium or calcium hypochlorite, or products commonly known by the trademarks Chloramine T and Amuchina, or other organic chlorides), formaldehyde and quaternary ammonium salts, as far as any compound having biocide activity which is compatible with carbon dioxide.

When chlorine gas is used, it is advisable to add a hygroscopic anhydrous salt to the container to adsorb any

moisture present and prevent the formation of hydrochloric acid by hydrolysis.

The use of mixtures of chlorine or hypochlorites is particularly preferred.

The method to which the invention relates offers considerable advantages with respect to the known processes.

Firstly, it has been demonstrated that carbon dioxide not only acts as a solvent, propellant and mixing agent, but also increases the disinfecting power of chlorine in particular, in a synergic way. It is therefore possible, in the presence of carbon dioxide, to achieve the same effect in biocidal (bactericidal, germicidal, fungicidal or algicidal) activity with concentrations of chlorine or other active substances which are smaller than usual. This overcomes completely the problems arising from high residual concentrations of chlorine.

Secondly, carbon dioxide enables the disinfectant substances to be stabilised for a long time, as they are stored in an inert, sterile environment.

Finally, carbon dioxide allows to obtain effective dispersal of the active compound in the receiving medium.

The concentration of the biocides can be modulated in a broad range of values by the composition of the mother mixture formed by carbon dioxide and the biocide itself and adequate metering of the same.

The use of sodium or calcium hypochlorites mixed with carbon dioxide produces a solution under pressure which can be metered very simply and accurately. By means of the propellant action of carbon dioxide it is possible to

introduce the disinfectant, in a more active formulation, also into conventional carbonating units or water distribution lines operating under pressure.

Mixtures of carbon dioxide and chlorine compounds are prepared in exactly the same way as other mixtures of compressed gases, liquefied compressed gases or gas/liquid blends.

The proposed technique is also suitable for preparing a wide variety of organic or inorganic mixtures with biocide properties in a liquid, semifluid, paste, gel or solid form.

The viscosity of these systems can be modulated on the basis of the final conditions of application of the product.

The method can be used also for extemporary and quick preparation of disinfectant solutions to clean and sterilise articles and surfaces contaminated by biological agents.

Application of the method object of this invention in particular solves the problems connected with the use of chlorine gas or compounds capable of releasing chlorine.

In fact, it is known that sodium or calcium hypochlorites solutions are irritant, and that chlorine gas is toxic.

However, the use of these biocides already diluted in carbon dioxide in a single container drastically reduces the risks associated with the storage and handling of these substances.

It also solves the problem of excesses of chlorine and/or its derivatives remaining in the water subjected to disinfection treatment.

The method of the invention provides hygienically suitable water and/or drinks with very low doses of chlorine,

at levels which do not affect odour and flavour of the water.

The pressurised mixtures of carbon dioxide according to the invention can be contained in bottles or tanks of various shapes and volumes, as required.

In one of the preferred embodiments of the invention the containers for said mixtures are metal cylinders, canisters or ampoules suitable to withstand internal pressure.

Metal cylinders usually having large capacity (15-200 litres) and intended, for example, for sanitation of swimming pools or other large-size plants, can contain, by way of example, 50 to 500 g of chlorine gas or 1 to 10 kg of a sodium hypochlorite solution containing 7% w/w of active chlorine together with carbon dioxide in amounts ranging from 10 to 100 kg. By means of said systems, for example, the hygienic control of a medium-size swimming pool (typically containing about 3000 m^3 of water) would be guaranteed for a time from 1 to 3 weeks, depending of the size and the content of the pressurised tank.

In case of canisters of smaller capacity (1 to 10 litres), intended for sanitation of small, even domestic, plants or small-size vessels such as aquaria, they can contain sodium hypochlorite solutions with 7% w/w active chlorine in amount of 5 to 100 mg, or 0.5 to 10 mg of chlorine gas, together with carbon dioxide in amounts from 5 to 100 g.

An example of a cylinder suitable for the purposes of the invention is shown in figure 1. This is a reinforced container (1) with a spout (2) for emission of the biocidal mixture contained in it, manually regulated by pressing a

button (4) connected to a suction tube (3) through which the product is expelled. Protective netting (5) and steel balls (6) to facilitate agitation and mixing of the components could be added for particularly viscous products.

In one embodiment of the invention said cylinder can be used also for delivering gel substances having anti-mould action; in this case the cylinder will contain, by way of example, 50 to 200 g of silica, 10 to 50 g of borax, 5 to 20 g of soap powder, 400 to 600 ml of a sodium hypochlorite solution with 7% w/w active chlorine, 200 to 500 ml of water and 20 to 50 g of carbon dioxide.

By this method a simple system delivering an anti-mould gel is obtained, said gel acting almost instantaneously when distributed on moulded areas. The gel has a very effective anti-mould activity because the contact of the active substances with the surface can be prolonged until any mould has been destroyed.

The size of the pressurized containers for chlorine mixtures may depend on the size of the receiving vessel (which may be a swimming pool, for example, or a bottle) or on the delivery system, which may dispense a single dose (e.g. for the treatment of a single bottle) or a multiple dose (as in the case of maintenance of certain characteristics in swimming pool water or domestic water).

The product can be metered from these containers:

- directly into the final receiving medium
- into another container which acts as a mixer/metering unit, and may already contain some of the constituents of the formulation.

Single-dose containers will typically consist of ampoules or vials made of metal or another material able to withstand internal pressure, fitted with a sealed septum which is perforated at the time of connection with a delivery system or a receiving vessel. Perforation of the septum allows the complete emptying out of the vial.

These systems are usually prepared starting from a master mixture made in a stirred reactor wherein the predetermined weights and volumes of the constituents in the form of a gas, vapour, solid, liquid or paste have been loaded. In the case of constituents in the gaseous or vapour state, the pressurised carbon dioxide must be fed to the reactor simultaneously; if the constituents are in a different physical state, it is fed subsequently.

By means of the internal pressure of the reactor, which is equipped with devices designed to guarantee uniform delivery of the contents, the individual ampoules or vials can be filled before application of the sealed septum.

As an alternative to pressurized loading, the mixture of liquid or solid constituents can be metered into each ampoule and then pressurized with carbon dioxide.

The size of this type of containers can also be very small, as is the case with those intended for the extemporary preparation of disinfectant solutions in soda siphons (generally of 1 litre capacity), where the vial volumes range around 10 ml; the vial will contain, by way of example, 0.1 to 2 mg of chlorine gas or 5 to 20 mg of 7% w/w active chlorine sodium hypochlorite solution, or other biocides, together with carbon dioxide in amounts ranging from 5 to 9

g.

The method (with the indicated dosages) can be used to make small single-dose vials to be used with an ordinary soda siphon to prepare carbonated drinks which are guaranteed to be hygienic, or simply to sanitize impotable water.

By adequately changing the capacities of the containers, and therefore the amounts of the biocides and carbon dioxide contained therein, it is also possible to obtain systems for dispensing multiple doses. These containers will be in the form of vials or ampoules or cylinders made of metal or other materials able to withstand internal pressure, and will be simply fitted with a sealed septum or other device which allows connection with a suitable metering system, possibly interlocked with a specifically programmed automatic control system.

The container is emptied by degrees, either continuously or discontinuously, depending on the type of delivery required.

This kind of solution requires devices designed to ensure that the mixture delivered has constant characteristics over time in terms of quality and composition, which are particularly stringent requirements in all cases in which controlled sterilising conditions are necessary (swimming pool water, water distributed for human consumption, etc.).

If the containers are fitted with sealed septa, the packaging procedure will be identical to that of single-dose systems.

If the containers are fitted with a connector device (such as a tap), the various operations can be performed in

two separate sequences:

a. loading of constituents of the mixture into the container without the tap; fitting of tap; pressurisation with carbon dioxide (possibly after creating vacuum in the container)

b. creation of vacuum in the container after fitting the tap; suction of the constituent mixture formed separately together with carbon dioxide (this criterion is essential in the case of gaseous or vapour mixtures); possibly followed by further pressurization with carbon dioxide.

For special applications, the containers used for the invention can be in the shape of a syringe for rapid blowing and injection.

Figure 2 shows a pistol-shaped syringe in which a screwing unit (14) with a travel stop (6) is fitted to the rear part.

A calibrated screw cap for the seating of the carbon dioxide cartridge is connected to unit (14). The head of this cartridge is fitted with a needle valve (2) designed to pierce the cartridge. The syringe reservoir (3) contains the solution to be delivered, which is introduced through the opening (12).

The end of the syringe is fitted with a solution suction tube (11) and a spring-loaded ball valve (8) in correspondence with nozzle (7), which is threaded so that the disposable needle (13) can be changed.

The opening mechanism of valve (8) uses a traction cable (10), or other mechanical means with controlled opening more suitable for a particularly specific use.

The opening mechanism is controlled by a trigger (9) inserted in the handgrip of pistol (4), preferably made of a soft material.

In one of the preferred embodiments of the invention the syringe is filled with a formaldehyde aqueous solution in amounts from 100 to 1000 ml, which can delivered by means of the propellant action of the carbon dioxide contained in the ampoule in amounts ranging from 5 to 10 g.

The following examples illustrate the invention in more detail.

EXAMPLE 1

Method for the preparation of pressurised single-dose cartridges able to sterilize water simultaneously with the carbonating action performed by carbon dioxide.

A standard stainless steel cartridge used to make soda water in a specific mixer has a volume of around 10-12 cc, and is typically filled with carbon dioxide with a "technical" purity grade up to saturation point, and a final pressure of about 7.0 MPa.

Under these conditions the cartridge contains 7-10 g of liquefied carbon dioxide, enough to make 1 litre of soda water.

The method proposed consists of introducing into the cartridge a solution of sodium hypochlorite containing 7% w/w of active chlorine, and then filling it with carbon dioxide.

For this exemplified application, it is sufficient for the cartridge to contain approx. 7-15 mg of concentrated solution to obtain a sterilising mixture which, when metered into the mixer containing 1 litre of water, guarantees

bactericidal efficiency higher than 99.9%, with contact times of about 30 minutes at room temperature.

EXAMPLE 2

The method proposed involves the previous introduction of a dessicant in powder form (typically 20 mg of oven-dried silica gel) into the empty cartridge described in example 1. The mixture of carbon dioxide and chlorine, previously prepared in the desired ratio into a pressurised tank equipped with a system for drying the gases, will then be introduced.

In the case in example it is sufficient for the cartridge to contain approx. 0.5-1 mg of chlorine to guarantee bactericidal efficiency higher than 99.9% in the mixer containing 1 litre of water, with contact times of about 30 minutes at room temperature, without affecting the odour and taste characteristics of the water.

EXAMPLE 3

Method for preparation of cylinders usable to sterilise water in public distribution plants, or for sterilising swimming pool water. Cylinders with a typical carbon dioxide content of 30 kg and a chlorine content of up to 120-150 g can be prepared for these uses.

Using a cylinder of this kind, it is possible to keep the microbial content of a swimming pool containing about 3000 m^3 of water, with average occupancy, under a reliable control for about a week (average weekly dose 0.05 mg of chlorine per litre of water), with bactericidal efficiency higher than 99.9% at room temperature.

EXAMPLE 4

Method for extemporary preparation of disinfectant solutions designed for sanitising articles and surfaces in general. The method proposed involves the introduction of a solution of sodium hypochlorite containing 7% w/w of active chlorine into the cartridge described in example 1, and then adding carbon dioxide.

In the case in example, it is sufficient for the cartridge to contain 1-2 mg of active chlorine to be diluted in the mixer containing 1 litre of water to obtain a disinfectant suitable for sanitising surfaces. This solution exhibits a bactericidal efficiency higher than 98% merely on contact, with contact times of about 30 minutes at room temperature.

EXAMPLE 5

Method for the preparation of a gel with an anti-mould action to be applied to walls and surfaces in general, whether or not they are destined to be painted subsequently.

One of the possible formulations of the method proposed involves mixing the following substances:

Borax: 30 g

Soap powder: 10 g

Silica: 160 g

Aqueous solution of sodium hypochlorite containing approx. 5% active chlorine: 750 ml.

Water: sufficient to make up to one litre.

The mixture obtained, which has the consistency of a gel, is introduced into a spray canister subsequently filled with carbon dioxide to a pressure of 3-7 MPa, and sprayed onto the

surface to be treated. The anti-mould effect is immediately evident at the time of application. If the wall shows evident mould, the result will be complete and lasting after 12 hour contact. The total disappearance of mould from the treated wall makes it possible to paint after the removal of the gel.

EXAMPLE 6

The cartridge in example 1 can be used in combination with a pressure syringe.

Figure 2 schematically illustrates the special syringe in question (with suitable attachments) which can be used to inject the solution.

The cartridge is filled with 500 ml of 40% w/v aqueous formaldehyde and pressurized by screwing the cartridge containing carbon dioxide to a pressure of 1-3 MPa, typically 1.5 MPa.

In this specific case, other propellant gases, such as helium, nitrogen, argon, etc., can be used instead of carbon dioxide whenever it is not considered essential to associate the biocidal function with carbon dioxide.

The cartridge allows very fast, efficient injection of the biocidal solution commonly used in the field of preservation of corpses and anatomical parts.

This method also makes it possible to inject the aqueous formaldehyde directly into natural or artificially made orifices in the human body.

CLAIMS

1. Method for the preparation, storage and metering of disinfectant and biocides which comprises mixing of said substances in a pressurised container with carbon dioxide in the form of a vapour, liquid/vapour mixture or supercritical fluid.

2. Method as claimed in claim 1, in which the disinfectant substances are selected from chlorine or compounds capable of developing active chlorine.

3. Method as claimed in claim 1, in which the compounds capable of developing active chlorine are alkali or alkaline-earth hypochlorites.

4. Method as claimed in claim 1 or 2, in which chlorine gas is mixed in the presence of an anhydrous salt in the container.

5. Method as claimed in one of the preceding claims, in which the mixture of carbon dioxide and disinfectant compound is metered in a manual, automatic or timed way.

6. Pressurised container containing a mixture of carbon dioxide and disinfectants or biocides compatible with carbon dioxide.

7. Container as claimed in claim 6, in which the disinfectant agent is selected from chlorine gas or alkali or alkaline-earth hypochlorites.

8. Container as claimed in claim 6, in which the container contains a desiccant anhydrous salt.

9. Container as claimed in one of claims 1 to 8, which is suitable for delivery and metering in a continuous or

discontinuous controlled manner.

10. Container as claimed in one of claims 6 to 9, which is suitable for delivering a single dose.

11. Container as claimed in claim 10, in the form of canisters, metal cartridges, vials or syringes.

12. Container as claimed in one of claims 6 to 9, suitable for delivering multiple doses.

13. Container as claimed in claim 12, in the form of cylinders or ampoules or tanks fitted with a sealed septum and/or a metering device.

14. Container as claimed in one of claims 6 to 13, in which the mixture is in liquid, semifluid, paste, gel or solid form.

FIGURE 1

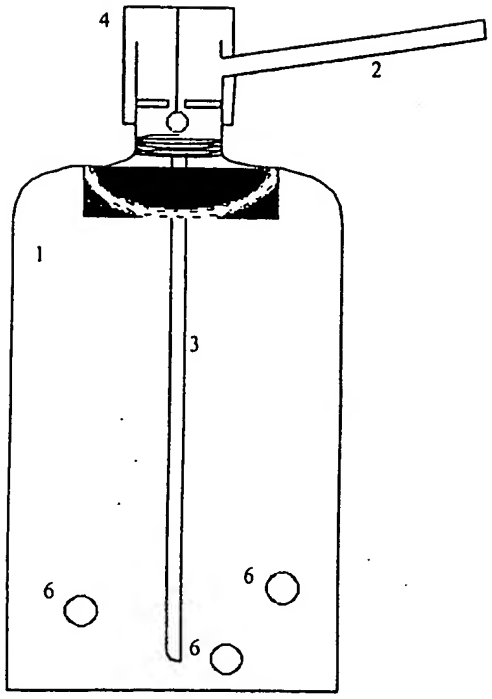
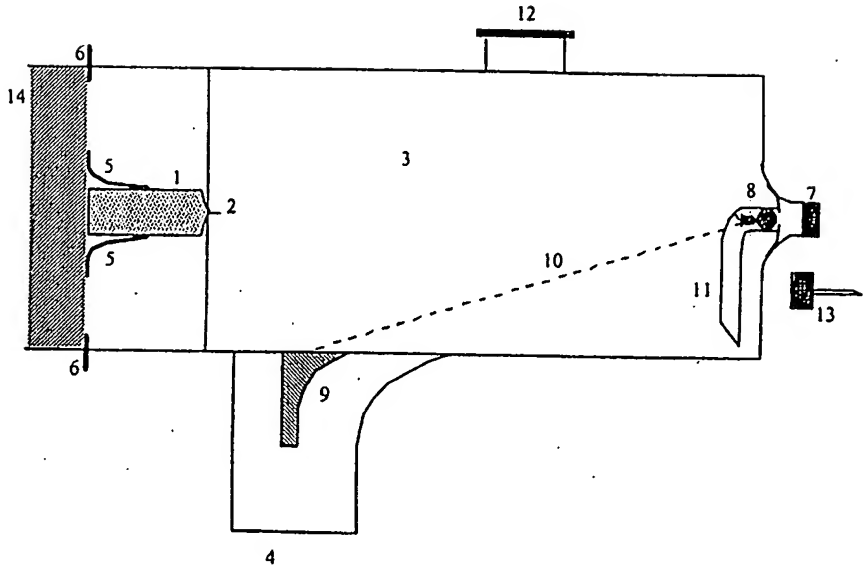


FIGURE 2



PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

PCT/EP 00 / 05836
International Application No.

23 JUN 2000 (23. 06. 2000)
International Filing Date

EUROPEAN PATENT OFFICE
PCT INTERNATIONAL APPLICATION
Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum) SCB551PCT

Box No. I TITLE OF INVENTION

METHOD FOR PREPARATION OF BIOCIDES MIXED WITH CARBON DIOXIDE IN A PRESSURISED CONTAINER

Box No. II APPLICANT

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This person is applicant for the purposes of: ☐ all designated States ☒ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

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☒ applicant and inventor
☐ inventor only *(If this check-box is marked, do not fill in below.)*

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State *(that is, country)* of residence: Italy

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: ☒ agent ☐ common representative

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☐ **Address for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Sheet No. 2

PCT/EP 00 / 05836

Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

If none of the following sub-boxes is used, this sheet should not be included in the request.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

MENICAGLI, Claudio
Via S. Antonio, 61
56125 PISA
Italy

This person is:
- [ ] applicant only
- [x] applicant and inventor
- [ ] inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality: Italy

State *(that is, country)* of residence: Italy

This person is applicant for the purposes of:
- [ ] all designated States
- [ ] all designated States except the United States of America
- [x] the United States of America only
- [ ] the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

This person is:
- [ ] applicant only
- [ ] applicant and inventor
- [ ] inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality:

State *(that is, country)* of residence:

This person is applicant for the purposes of:
- [ ] all designated States
- [ ] all designated States except the United States of America
- [ ] the United States of America only
- [ ] the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

This person is:
- [ ] applicant only
- [ ] applicant and inventor
- [ ] inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality:

State *(that is, country)* of residence:

This person is applicant for the purposes of:
- [ ] all designated States
- [ ] all designated States except the United States of America
- [ ] the United States of America only
- [ ] the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

This person is:
- [ ] applicant only
- [ ] applicant and inventor
- [ ] inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality:

State *(that is, country)* of residence:

This person is applicant for the purposes of:
- [ ] all designated States
- [ ] all designated States except the United States of America
- [ ] the United States of America only
- [ ] the States indicated in the Supplemental Box

- [ ] Further applicants and/or (further) inventors are indicated on another continuation sheet.

Box No.V DESIGNATION OF S ES

The following designations are hereby made under Rule 4.9(a) *(mark the applicable check-boxes; at least one must be marked)*:

Regional Patent

☒ **AP** ARIPO Patent: GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT

☒ **EA** Eurasian Patent: AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT

☒ **EP** European Patent: AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT

☒ **OA** OAPI Patent: BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT *(if other kind of protection or treatment desired, specify on dotted line)* .....

National Patent *(if other kind of protection or treatment desired, specify on dotted line)*:

☒ **AE** United Arab Emirates
☒ **AL** Albania
☒ **AM** Armenia
☒ **AT** Austria
☒ **AU** Australia
☒ **AZ** Azerbaijan
☒ **BA** Bosnia and Herzegovina
☒ **BB** Barbados
☒ **BG** Bulgaria
☒ **BR** Brazil
☒ **BY** Belarus
☒ **CA** Canada
☒ **CH and LI** Switzerland and Liechtenstein
☒ **CN** China
☒ **CR** Costa Rica
☒ **CU** Cuba
☒ **CZ** Czech Republic
☒ **DE** Germany
☒ **DK** Denmark
☒ **DM** Dominica
☒ **EE** Estonia
☒ **ES** Spain
☒ **FI** Finland
☒ **GB** United Kingdom
☒ **GD** Grenada
☒ **GE** Georgia
☒ **GH** Ghana
☒ **GM** Gambia
☒ **HR** Croatia
☒ **HU** Hungary
☒ **ID** Indonesia
☒ **IL** Israel
☒ **IN** India
☒ **IS** Iceland
☒ **JP** Japan
☒ **KE** Kenya
☒ **KG** Kyrgyzstan
☒ **KP** Democratic People's Republic of Korea
☒ **KR** Republic of Korea
☒ **KZ** Kazakhstan
☒ **LC** Saint Lucia
☒ **LK** Sri Lanka
☒ **LR** Liberia
☒ **LS** Lesotho
☒ **LT** Lithuania
☒ **LU** Luxembourg
☒ **LV** Latvia
☒ **MA** Morocco
☒ **MD** Republic of Moldova
☒ **MG** Madagascar
☒ **MK** The former Yugoslav Republic of Macedonia
☒ **MN** Mongolia
☒ **MW** Malawi
☒ **MX** Mexico
☒ **NO** Norway
☒ **NZ** New Zealand
☒ **PL** Poland
☒ **PT** Portugal
☒ **RO** Romania
☒ **RU** Russian Federation
☒ **SD** Sudan
☒ **SE** Sweden
☒ **SG** Singapore
☒ **SI** Slovenia
☒ **SK** Slovakia
☒ **SL** Sierra Leone
☒ **TJ** Tajikistan
☒ **TM** Turkmenistan
☒ **TR** Turkey
☒ **TT** Trinidad and Tobago
☒ **TZ** United Republic of Tanzania
☒ **UA** Ukraine
☒ **UG** Uganda
☒ **US** United States of America
☒ **UZ** Uzbekistan
☒ **VN** Viet Nam
☒ **YU** Yugoslavia
☒ **ZA** South Africa
☒ **ZW** Zimbabwe

Check-boxes reserved for designating States which have become party to the PCT after issuance of this sheet:

☒ DZ Algeria
☒ AG Antigua and Barbuda

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. *(Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)*

Box No. VI PRIORITY CLAIM ☐ Further priority claims are indicated in the Supplemental Box.

Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is: national application: country	regional application:* regional Office	international application: receiving Office
item (1) 25 June 1999 (25.06.99)	MI99A001416	Italy		
item (2)				
item (3)				

☐ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) *(only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office)* identified above as item(s): _____

* *Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.*

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) *(if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used)* : ISA/

Request to use results of earlier search; reference to that search *(if an earlier search has been carried out by or requested from the International Searching Authority):*

Date *(day/month/year)* Number Country *(or regional Office)*

Box No. VIII CHECK LIST; LANGUAGE OF FILING

This international application contains the following number of sheets:

request	: 04
description (excluding sequence listing part)	: 15
claims	: 02
abstract	: 01
drawings	: 02
sequence listing part of description	: --
Total number of sheets	: 24

This international application is accompanied by the item(s) marked below:

1. ☐ fee calculation sheet
2. ☒ separate signed power of attorney
3. ☐ copy of general power of attorney; reference number, if any:
4. ☐ statement explaining lack of signature
5. ☐ priority document(s) identified in Box No. VI as item(s):
6. ☐ translation of international application into (language):
7. ☐ separate indications concerning deposited microorganism or other biological material
8. ☐ nucleotide and/or amino acid sequence listing in computer readable form
9. ☒ other *(specify)*: Request for fax acknowledgement

Figure of the drawings which should accompany the abstract:

Language of filing of the international application: ~~English~~

Box No. IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

Fabrizio MANOJA

21 June 2000 (21.06.00)

For receiving Office use only

1. Date of actual receipt of the purported international application: 23.06.00 — 23 JUN 2000
2. Drawings: ☒ received: ☐ not received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:
4. Date of timely receipt of the required corrections under PCT Article 11(2):
5. International Searching Authority (if two or more are competent): ISA/
6. ☐ Transmittal of search copy delayed until search fee is paid.

For International Bureau use only

Date of receipt of the record copy by the International Bureau: